

V. Masson-Delmotte · M. Kageyama  
P. Braconnot · S. Charbit · G. Krinner  
C. Ritz · E. Guilyardi · J. Jouzel · A. Abe-Ouchi  
M. Crucifix · R. M. Gladstone · C. D. Hewitt  
A. Kitoh · A. N. LeGrande · O. Marti  
U. Merkel · T. Motoi · R. Ohgaito · B. Otto-Bliesner  
W. R. Peltier · I. Ross · P. J. Valdes  
G. Vettoretti · S. L. Weber · F. Wolk · Y. Yu

## Past and future polar amplification of climate change: climate model intercomparisons and ice-core constraints

Published online: 19 May 2006  
© Springer-Verlag 2006

### 1 Climate Dynamics (2006) 26: 513–529

Unfortunately, author corrections to Figs. 2, 3a, b, and 4a, b were not carried out.

The online version of the original article can be found at  
<http://dx.doi.org/10.1007/s00382-005-0081-9>

V. Masson-Delmotte (✉) · M. Kageyama · P. Braconnot  
S. Charbit · E. Guilyardi · J. Jouzel · O. Marti  
Laboratoire des Sciences du Climat et de l'Environnement,  
(LSCE/IPSL, UMR CEA-CNRS 1572) L'Orme des Merisiers,  
Bâtiment 701, CEA Saclay, 91 191 Gif-sur-Yvette Cedex, France  
E-mail: valerie.masson@cea.fr

G. Krinner · C. Ritz  
Laboratoire de Glaciologie et de Géophysique de l'Environnement,  
(UMR 5183 CNRS-UJF), Domaine Universitaire,  
St Martin d'Hères, France

A. Abe-Ouchi  
Center for Climate System Research,  
The University of Tokyo, Kashiwa 277-8568, Japan

M. Crucifix · C. D. Hewitt  
Hadley Centre for Climate Prediction and Research,  
Met Office, FitzRoy Road, Exeter, EX1 3 PB Devon, UK

R. M. Gladstone · I. Ross · P. J. Valdes  
School of Geographical Sciences,  
University of Bristol, University Road,  
Bristol BS8 1SS, UK

A. Kitoh · T. Motoi  
Climate Research Department,  
Meteorological Research Institute, 1-1 Nagamine, Tsukuba,  
Ibaraki 305-0052, Japan

A. N. LeGrande  
NASA Goddard Institute for Space Studies  
and Center for Climate Systems Research,  
Columbia University, New York, NY, USA

The correct versions are shown below.

U. Merkel  
IFM-GEOMAR, Duesternbrooker Weg 20,  
24105 Kiel, Germany

R. Ohgaito · A. Abe-Ouchi  
Frontier Research Center for Global Change (FRCGC),  
JAMSTEC, Yokohama City 236-0001, Japan

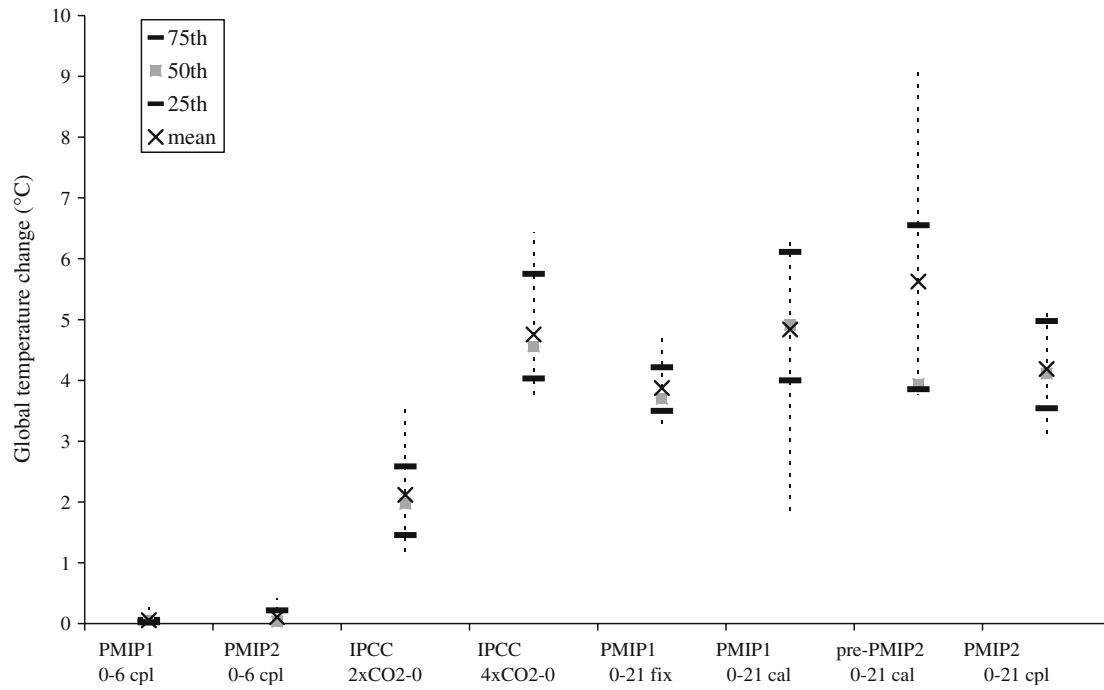
B. Otto-Bliesner  
Climate Change Research, National Center for Atmospheric  
Research, 1850 Table Mesa Drive, P.O. Box 3000,  
Boulder, CO 80307, USA

W. R. Peltier · G. Vettoretti  
Department of Physics, University of Toronto,  
60 St. George Street, Toronto  
ON M5S 1A7, Canada

S. L. Weber  
Climate Variability Research, Royal Netherlands  
Meteorological Institute (KNMI),  
P.O. Box 201, 3730 AE De Bilt,  
The Netherlands

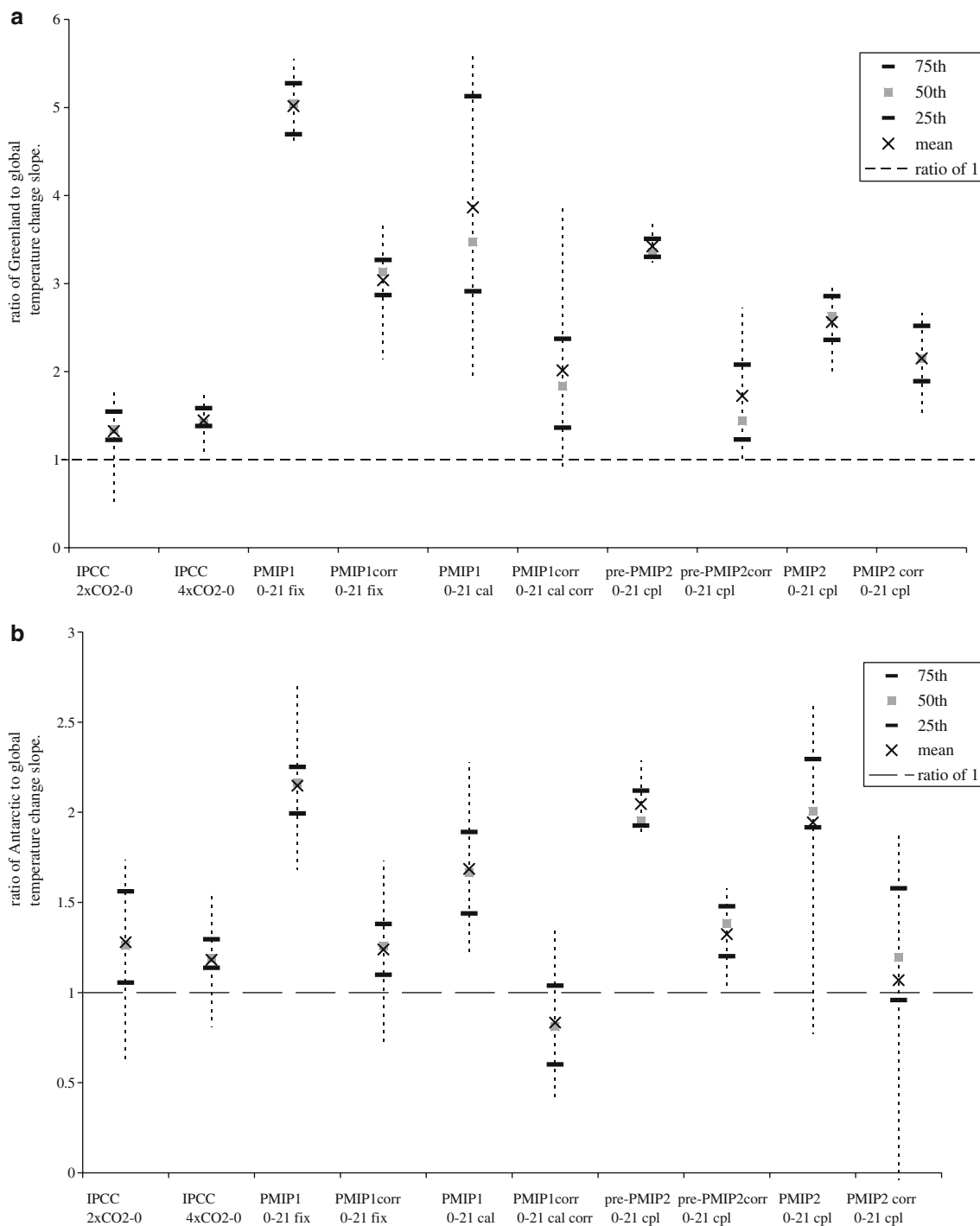
F. Wolk  
Institut d'Astronomie et de Géophysique G. Lemaître,  
Université catholique de Louvain, Chemin du cyclotron, 2,  
1348 Louvain-la-Neuve, Belgium

Y. Yu  
LASG, Institute of Atmospheric Physics,  
Chinese Academy of Sciences,  
P.O. Box 9804, Beijing 10029,  
People's Republic of China



**Fig. 2** Annual mean global temperature changes simulated by a variety of climate models run under similar boundary conditions. The full range (*dashed line*), mean (*cross symbol*), 25th (*lower bold dash symbol*), 50th (*grey square symbol*), 75th (*upper bold dash*

*symbol*) percentiles of the various model results are calculated from the distribution of the various model results (see Table 2). The “fix”, “slab” and “cpl” abbreviations refer to different configurations of models used and are described in Sect. 3 and Table 1



**Fig. 3 a** Central Greenland polar amplification (defined as the ratio between central Greenland and global annual mean temperature changes) simulated by climate models. The full range (*dashed line*), mean (*cross symbol*), 25th (*lower bold dash symbol*), 50th (*grey square symbol*), 75th (*upper bold dash symbol*) percentiles of the

various model results are calculated from the distribution of the various model results (see Table 2). “corr” stands for elevation-corrected temperature values (see text). **b** Same as **(a)** but for central eastern Antarctica. Note that the vertical scale is half as small as for Greenland

**Fig. 4 a** Comparison of Last Glacial Maximum to control central Greenland annual mean temperature change simulated by climate models (PMIP2 coupled ocean-atmosphere simulations only) with the range of paleoclimatic reconstructions. *Filled black squares* show direct model results. *Open black squares* show model results corrected from LGM to control ice sheet elevation changes (“elevation corrected” results). *Grey squares* show model results corrected from elevation changes and precipitation weighted (“seasonality corrected” results). *Horizontal long-dashed lines* reflect the range of temperature change derived from Greenland borehole thermometry. *Short dashed lines* correspond to slopes of 1, 2 and 3 for reference. A linear regression calculated on the results of these four models is also displayed (*solid black line* and regression result). Values below zero are not displayed (results of ECBILT CLIO with corrections). **b** Same as (a) but for central Antarctica.

*Horizontal long-dashed lines* reflect the range of temperature change derived from Antarctic ice core water stable isotopes. **c** Same as (a) but for future climate change simulations. *Open black squares* represent 4 × CO<sub>2</sub> simulation anomalies, and *filled black rhomboids* 2 × CO<sub>2</sub> simulation anomalies. The *solid line* is a linear regression on all the simulation results. The *black dashed lines* represent lines with slopes of 1 and 2. **d** Same as (b) but for future climate change simulations. *Open black squares* represent 4 × CO<sub>2</sub> simulation anomalies, and *filled black rhomboids* 2 × CO<sub>2</sub> simulation anomalies. The *solid line* is a linear regression on all the simulation results. The *black dashed lines* represent lines with slopes of 1 and 2

